Name:

The following 4 questions refer to the following study

A recent study compared two different treatments for repairing a torn knee ligament. The subjects were 121 active, young adult volunteers who had acute knee ligament injuries. They were ***randomly*** divided into 2 groups: Group A received physical therapy and surgery while Group B received only physical therapy (with the option to later have surgery). No group received fake surgery. Evaluators who ***were*** **aware** of which patients were in which group rated the subjects on knee strength, stability, flexibility, etc. over a 2 year period and found that both groups showed substantial improvement, but that there were no significant differences on any measure between the 2 groups.

2 pt

Which of the following best describes this study?

1.**A**◯ It's a randomized controlled double-blind experiment.
B◯ It's a randomized controlled experiment without a placebo and without "blind" evaluators
C◯ It's a randomized controlled experiment with a placebo.
D◯ It's an observational study

2 pt

23 of the 60 subjects assigned to Group B took the option of delayed surgery. Should their results be kept in Group B, or moved to Group A (the surgery group)?

2.**A**◯ Moved to Group A, since they ended up having surgery so their results should be part of the surgery group.
B◯ Kept in Group B since they were randomly assigned to Group B and the Group B treatment allowed the option of later having surgery.
C◯ Their results should be tossed out to avoid confounding the study.

2 pt

Which conclusion is best supported by the evidence?

3.**A**◯ This study is strong evidence that surgery helps when administered early but is of little benefit when delayed.
B◯ This study provides strong evidence that surgery adds little to no benefit to physical therapy as a treatment for torn knee ligaments in active young adults.
C◯ This study shows that those who are given the option of surgery do better than those who are not given that option.

2 pt

Which of the following represents the best improvement of the design of this study?

4.A◯ Do not provide physical therapy to everyone in Group A since surgery is not provided to everyone in Group B.
B◯ Add evaluators to the study who are not aware of which group the subjects are in whenever possible.
C◯ Allow the subjects, in consultation with their doctors, to choose whether to join Group A or Group B.

1)	• B • false • true • false • false
2)	• B • false • true • false
3)	• B • false • true • false
4)	• B • false • true • false

The following 4 questions refer to the following study:

Two professors both taught the same 2 Computer Programming and Computer Games courses. The table below gives the results of how their students evaluated them on a scale of 1-5 with 5 being the highest.

	Professor A		**Professor B**	
	# Times Course Taught	**Average Rating**	**# Times Course Taught**	**Average Rating**
Computer Games	8	4.5	1	5
Programming	2	1.5	9	3
Total	10	3.9	10	3.2

2 pt

Which professor has a higher average rating in the Computer Games course?

5.A◯ Professor A
B◯ Professor B
C◯ cannot be determined from the information given

2 pt

Which professor has a higher average rating in the Computer Programming course?

6.A◯ Professor A
B◯ Professor B
C◯ cannot be determined from the information given

2 pt

Which professor has the higher overall (total) average rating?

7.A◯ Professor A
B◯ Professor B
C◯ cannot be determined from the information given

2 pt

Professor A and B both decide to teach the same course next semester. Based on their past ratings who would you expect to get a higher rating?

8.A◯ Professor A
B◯ Professor B
C◯ It depends on whether they teach the computer games or the programming course

5)	• B • false • true • false
6)	• B • false • true • false
7)	• A • true • false • false
8)	• B • false • true • false

The following 2 questions refer to the following study

Suppose I carried out a study to determine whether I-clickers would help students do better in Stat 100. I randomly assigned half the students to the treatment group and half to the control group. The treatment group students were given I-clickers and encouraged to use them in class. (Their I-clicker "scores" were recorded and counted as half of their bonus points.) The control group students were treated as usual. At the end of the semester I compared the overall average of the 2 groups and found no significant difference.

2 pt

This study is an example of ...

9.A◯ Observational Study
B◯ Randomized Controlled Double-Blind Experiment
C◯ Randomized Controlled experiment but not Double-Blind

2 pt

Of course not everyone assigned to treatment used the I-clickers or even came to class. Should I just compare those who used the I-clickers to the controls? Which comparison should be used to best answer the question of whether or not assigning I-clickers would help students do better in Stat 100?

10.A◯ You should compare those in the treatment group who actually used the I-clickers most of the time to those in the treatment group who didn't since both groups were given the same option of using I-clickers.
B◯ You should compare only those who actually used the I-clickers to the controls, since I-clickers can only help those who use them.
C◯ You should compare everyone assigned to treatment to everyone assigned to control, otherwise the treatment group might consist of a different type of population (students who come to class) than the controls which could confound the results.

9)	• C • false • false • true
10)	• C • false • false • true

The following 4 questions refer to the following:

A doctor measures the temperatures of **9 people** with the flu. Their average is **100.6 °F (Fahrenheit)** with a SD of **1.7 °F**.

For the following two questions: Suppose the thermometer was mis-calibrated and reading **0.8 °F** too low. To correct the situation the doctor added 0.8 °F to each of the 9 temperatures.

1 pt

The new average becomes:

11. **A**◯ 101.4 **B**◯ 100.7 **C**◯ 100.5 **D**◯ 99.8 **E**◯ 100.6

1 pt

The new SD becomes:

12. **A**◯ 0.9 **B**◯ 2.5 **C**◯ 2.7 **D**◯ 1.8 **E**◯ 1.7

For the following two questions: If the **original** temperatures were converted to Centigrade by subtracting 32 °F from each temperature and then multiplying by 5/9

Round your answers to the nearest hundredth.(2 decimal places)

0.5 pt

The new average would be _____ Centigrade.

13. **A**◯ 73.67 **B**◯ 87.89 **C**◯ 38.11 **D**◯ 23.89 **E**◯ 100.6

0.5 pt

The new SD would be:

14. **A**◯ 0.94 **B**◯ 1.7 **C**◯ 0.52 **D**◯ 0.50 **E**◯ 1.39

11)	• A • true • false • false • false • false
12)	• E • false • false • false • false • true
13)	• C • false • false • true • false • false
14)	• A • true • false • false • false • false

The following 6 questions refer to the following study:

A study reported in the August 30, 2010 issue of Time magazine claimed that people who abstain from alcohol die sooner than those who drink, even sooner than those who drink heavily. The study tracked 1,824 subjects aged 55-65 for 20 years and found that those who didn't drink any alcohol at all had the highest death rate 69%, compared to only 41% for moderate drinkers and 60% for heavy drinkers.

2 pt

Based only on the information above, this study is an example of ...

15.A◯ Randomized Double-Blind Controlled Experiment
B◯ Non-Randomized Controlled Experiment
C◯ Observational Study
D◯ Randomized Controlled Experiment without a placebo

2 pt

Based only on the information above, which statement is best?

16.A◯ This study is strong evidence that abstaining from alcohol causes people to die sooner.
B◯ This study shows that abstaining from alcohol is associated with but definitely does not cause people to die sooner.
C◯ This study only shows that abstaining from alcohol is associated with dying sooner: it doesn't show whether or not abstaining from alcohol actually causes people to die sooner.

Below are either **confounders** (that mix up the results making it look like not drinking shortens life when it's really something else), **causal links** that explain *how* drinking may increase life span or neither.

1 pt

Age: The non-drinking group may have included more older people who are likely to die sooner.

17. **A**◯ Confounder **B**◯ Causal link **C**◯ Neither

1 pt

Religion: The non-drinking group may have included more people whose faith prevents them from drinking.

18. **A**◯ Confounder **B**◯ Causal link **C**◯ Neither

1 pt

Cardiovascular Benefits: Consuming alcohol increases the good kind of cholesterol (HDL) which lowers ones risk of heart disease and causes people to live longer.

19. **A**◯ Confounder **B**◯ Causal link **C**◯ Neither

1 pt

Health problems: The non-drinking group may have included more people who are sick and can't drink for medical reasons and are also more likely to die sooner.

20. **A**◯ Confounder **B**◯ Causal link **C**◯ Neither

15)	• C • false • false • true • false
16)	• C • false • false • true
17)	• A • true • false • false
18)	• C • false • false • true
19)	• B • false • true • false
20)	• A • true • false • false

The following 10 questions pertain to the following:

A group of college seniors were asked the question:"How many names can you remember from your 1st grade class?" Their responses are summarized in the table.

Names(Width)	% Area	Height
0-10	10	Box 1
10-14	16	Box 2
14-22	24	Box 3
22-26	32	Box 4
26-28	18	Box 5

For the next five questions, choose correct values for the numbered boxes in the height column above.(Round your answer to the nearest whole number when necessary)

2 pt

Box 1 is closest to:

21. **A**◯ 10 **B**◯ 2 **C**◯ 1 **D**◯ 3 **E**◯ more information is needed

2 pt

Box 2 is closest to:

22. **A**◯ 6 **B**◯ 1 **C**◯ 4 **D**◯ 5 **E**◯ more information is needed

2 pt

Box 3 is closest to:

23. **A**◯ 3 **B**◯ 1 **C**◯ 2 **D**◯ 4 **E**◯ more information is needed

2 pt

Box 4 is closest to:

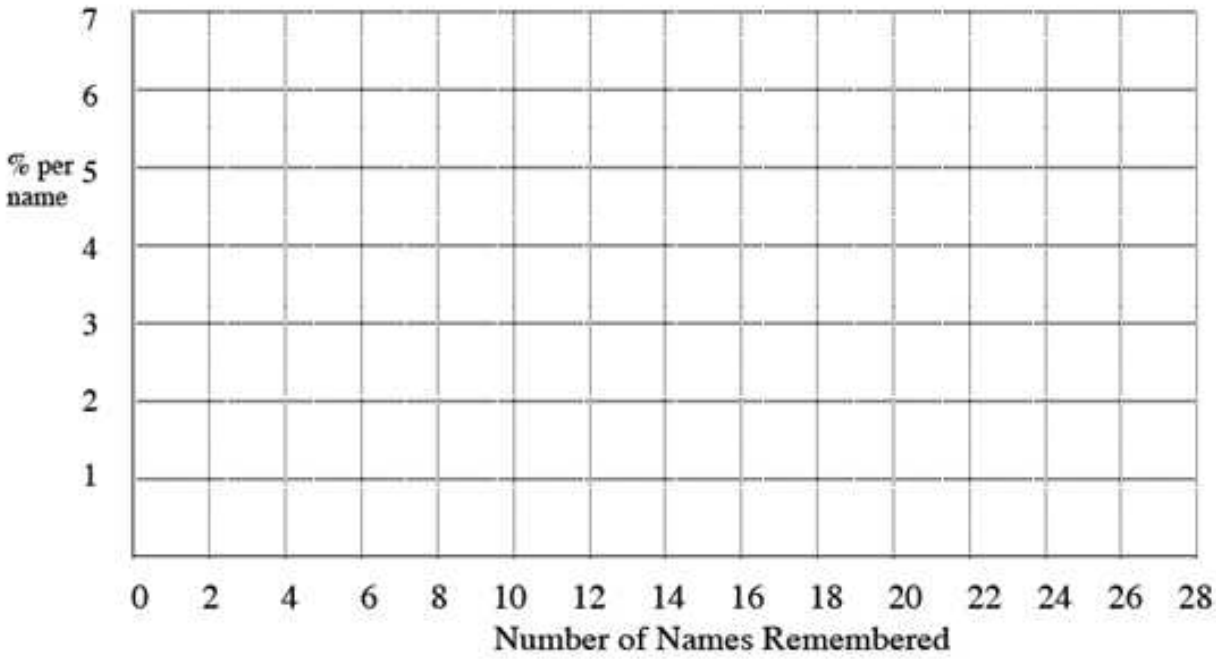
24. **A**◯ 8 **B**◯ 2 **C**◯ 9 **D**◯ 1 **E**◯ more information is needed

2 pt

Box 5 is closest to:

25. **A**◯ 1 **B**◯ 9 **C**◯ 11 **D**◯ 10 **E**◯ more information is needed

You may find it helpful to draw the histogram below in order to answer the questions that follow



2 pt

What is the median number of names remembered?

26. **A**◯ 24 **B**◯ 18 **C**◯ 22 **D**◯ 20 **E**◯ more information is needed

2 pt

The number of people who remember 0-10 names is _____ the number of people who remembered **22-28** names.

27. **A**◯ less than **B**◯ the same as **C**◯ more than **D**◯ cannot be determined from the information given

For the next three questions, suppose the people in the 26-28 block all forget 2 names, how would the average, median and SD be affected?

1 pt

SD would ...

28. **A**◯ Decrease **B**◯ Increase **C**◯ Stay the same **D**◯ Cannot be determined from the information given

1 pt

Median would ...

29. **A**◯ Decrease **B**◯ Increase **C**◯ Stay the same **D**◯ Cannot be determined from the information given

1 pt

Average would ...

30. **A**◯ Decrease **B**◯ Increase **C**◯ Stay the same **D**◯ Cannot be determined from the information given

21)	• C • false • false • true • false • false
22)	• C • false • false • true • false • false
23)	• A • true • false • false • false • false
24)	• A • true • false • false • false • false
25)	• B • false • true • false • false • false
26)	• C • false • false • true • false • false
27)	• A • true • false • false • false
28)	• A • true • false • false • false
29)	• C • false • false • true • false
30)	• A • true • false • false • false

The following 5 questions pertains to the following list of numbers: -3,-1,5,11

2.5 pt
The average of the list is:

31. **A**◯ 4 **B**◯ 2 **C**◯ 3 **D**◯ 1 **E**◯ 5

2.5 pt
The median of the list is:

32. **A**◯ 4 **B**◯ 3 **C**◯ 2 **D**◯ 0 **E**◯ 1

2 pt
The list of deviations from the average is:

33. **A**◯ 6,4,-2,-8 **B**◯ 4,6,2,8 **C**◯ -6,-4,2,8

2 pt
The sum of the deviations from the average must always = _____ ?

34. **A**◯ 0 **B**◯ -1 **C**◯ 1 **D**◯ more information is needed

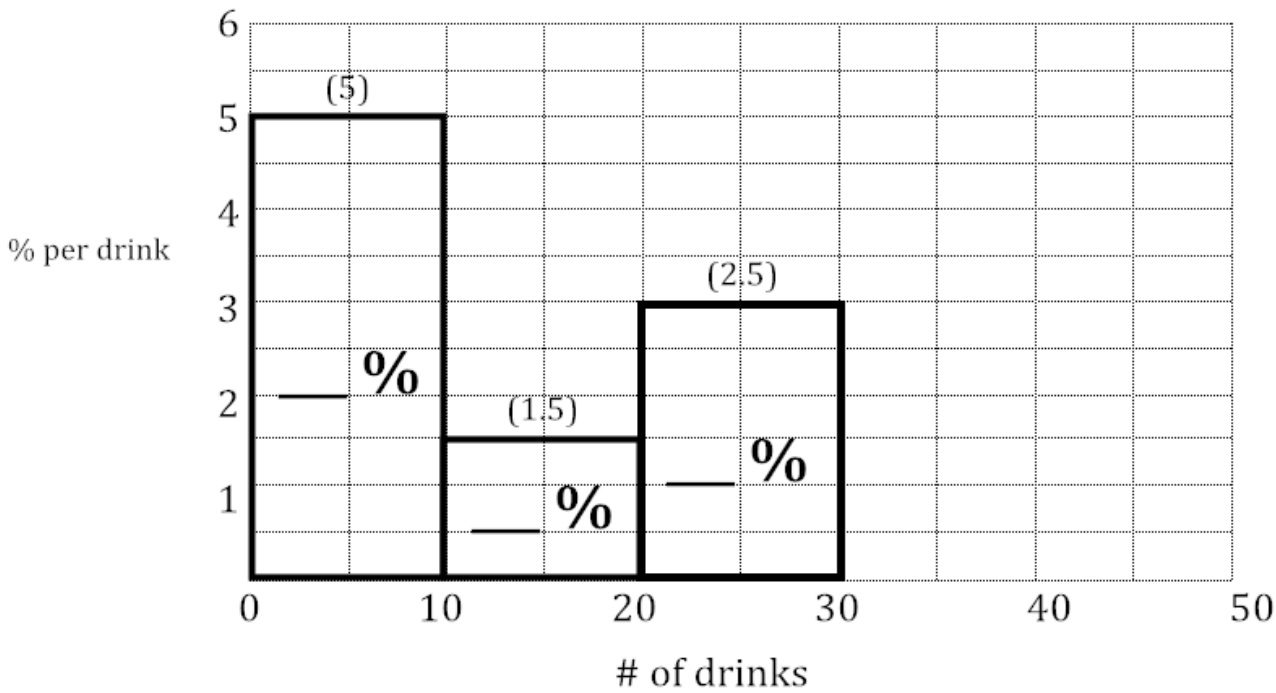
1 pt
The SD of the list is ***(Round answer to two decimal places if necessary)***:

35. **A**◯ 120 **B**◯ 32 **C**◯ 5.48 **D**◯ 0

31)	• C • false • false • true • false • false
32)	• C • false • false • true • false • false
33)	• C • false • false • true
34)	• A • true • false • false • false
35)	• C • false • false • true • false

The following 11 questions refer to the histogram below:

The figure below is a histogram for the number of alcoholic drinks consumed per week by STAT 100 students (roughly based on past semester's survey data). The height of each block is given in parentheses above the block. The block over the 30-50 drinks interval is missing.



2 pt
What percentage of the subjects fell in 10-20 drinks interval?

36. **A**◯ 20% **B**◯ 15% **C**◯ 1.5% **D**◯ 10% **E**◯ none of the given choices

2 pt
What percentage of the subjects fell in 0-10 drinks interval?

37. **A**◯ 45% **B**◯ 50% **C**◯ 55% **D**◯ 5% **E**◯ none of the given choices

2 pt
What percentage of the subjects fell in 20-30 drinks interval?

38. **A**◯ 2.5% **B**◯ 25% **C**◯ 30% **D**◯ 20% **E**◯ none of the given choices

1 pt

How much area must the missing block have?

39. **A**◯ 15% **B**◯ 0.5% **C**◯ 10% **D**◯ 5% **E**◯ none of the given choices

1 pt

How tall must the missing block be?

40. **A**◯ 0.5 **B**◯ 10 **C**◯ 0 **D**◯ 1 **E**◯ none of the given choices

1 pt

What is the median number of drinks?

41. **A**◯ 10 **B**◯ 5 **C**◯ 11 **D**◯ 9 **E**◯ none of the given choices

1 pt

The average is _____ the median?

42. **A**◯ less than **B**◯ the same as **C**◯ greater than

1 pt

What percentage of the subjects reported drinking 26 drinks per week? (Assume an even distribution throughout the intervals.)

43. **A**◯ 0.5% **B**◯ 2.5% **C**◯ 25% **D**◯ 1.5% **E**◯ none of the given choices

For the next three questions, suppose all the students who answered **4 drinks** changed to **7 drinks** per week while all other students stayed the same.

How would that affect the average, the median, and the SD?

1 pt

Median would _____

44. **A**◯ Increase **B**◯ Decrease **C**◯ Stay the Same

1 pt

SD would _____

45. **A**◯ Increase **B**◯ Decrease **C**◯ Stay the Same

1 pt

Average would _____

46. **A**◯ Increase **B**◯ Decrease **C**◯ Stay the Same

36)	• B • false • true • false • false • false
37)	• B • false • true • false • false • false
38)	• B • false • true • false • false • false
39)	• C • false • false • true • false • false
40)	• A • true • false • false • false • false
41)	• A • true • false • false • false • false
42)	• C • false • false • true
43)	• B • false • true • false • false • false
44)	• C • false • false • true
45)	• B • false • true • false
46)	• A • true • false • false

The following 6 questions pertain to the following:

Suppose IQ scores among US adults follow the normal curve with an average of **104** and a SD of **24**.

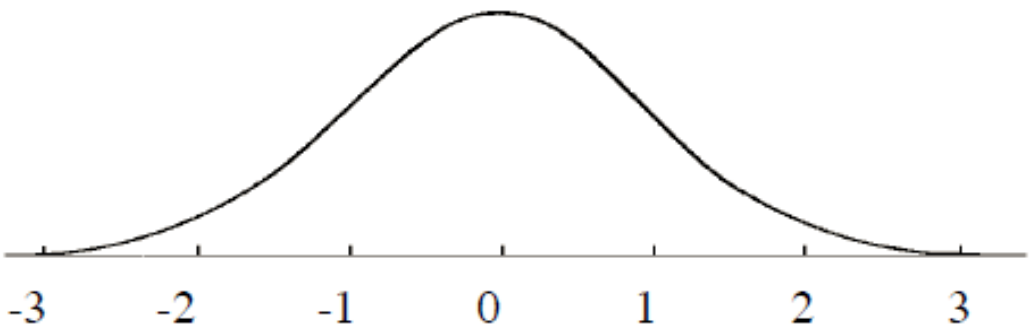
What percent of the population have IQ's over 122 ?

2 pt

First convert **122** to a Z score. The Z score is closest to ____.**(Round your answer to 2 decimal places if necessary)**

47. **A**◯ 0.75 **B**◯ 9 **C**◯ 226 **D**◯ 18 **E**◯ 0

Now, mark the Z-score on the curve, divide the curve into a middle area and 2 tails and mark the % of the area within the 3 parts to answer the question belows **(Round the middle area given in the table to the nearest whole number)**



1 pt

The middle area is closest to ____ %

48. **A**◯ 55 **B**◯ 28 **C**◯ 45 **D**◯ 22 **E**◯ none of the given choices

1 pt

Now using the normal table, ____% of the population have IQs **over 122**

49. **A**◯ 45 **B**◯ 28 **C**◯ 22 **D**◯ 55 **E**◯ none of the given choices

What percent of the population have IQ scores between 92 and 104?

First convert 92 and 104 to Z scores.

2 pt

Z score for 92 is

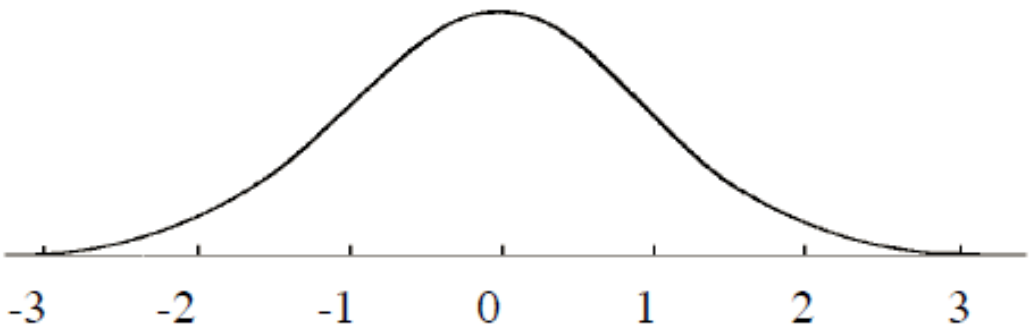
50. **A**◯ -0.5 **B**◯ -0.4 **C**◯ -0.6 **D**◯ 0 **E**◯ none of

1 pt

Z score for 104 is

51. **A**◯ 0.2 **B**◯ 0 **C**◯ 0.1 **D**◯ -0.5 **E**◯ none of the given choices

Now use the normal table to determine what % of the population have IQ scores **between 92 and 104**. Mark the Z scores on the curve, shade the area between the z-scores.



1 pt

What % of the population have IQs **between 92 and 104 ?**.

52. **A**◯ 19 **B**◯ 31 **C**◯ 38 **D**◯ 72 **E**◯ 69

47)	• A • true • false • false • false • false
48)	• A • true • false • false • false • false
49)	• C • false • false • true • false • false
50)	• A • true • false • false • false • false
51)	• B • false • true • false • false • false
52)	• A • true • false • false • false • false

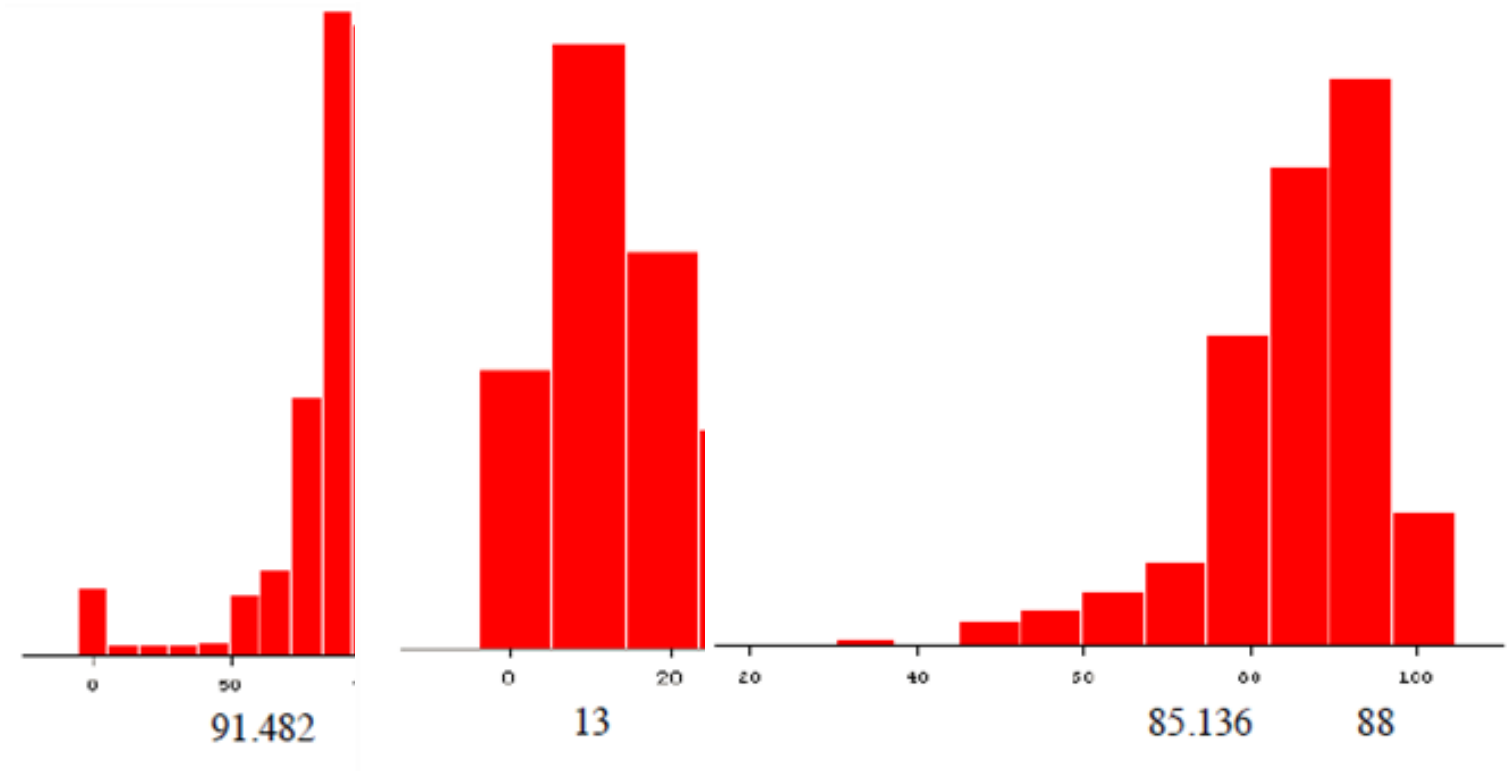
The following 6 questions pertain

Below are 3 histograms. Two represent our survey responses to the 2 questions:

Speed: "What is the fastest you've ever driven in mph?"

Shoes: "How many pairs of shoes do you own?"

The third represents exam scores from a previous STAT 100 exam (maximum possible score was 100).



Histogram A Histogram B Histogram C

2 pt
Histogram ___ represents Shoes.

53. **A**◯ A **B**◯ B **C**◯ C

2 pt
Histogram ___ represents Exam scores.

54. **A**◯ A **B**◯ B **C**◯ C

2 pt

Histogram ___ represents Speed.

55. **A**◯ A **B**◯ B **C**◯ C

Below each histogram are 2 numbers, one is the average and the other is the median. Which is the average?

1 pt

The average of Histogram A is ___.

56. **A**◯ 91.482 **B**◯ 93

1 pt

The average of Histogram B is ___.

57. **A**◯ 13 **B**◯ 16.42

1 pt

The average of Histogram C is ___.

58. **A**◯ 85.136 **B**◯ 88

53)	• B • false • true • false
54)	• C • false • false • true
55)	• A • true • false • false
56)	• A • true • false
57)	• B • false • true
58)	• A • true • false

The following 12 questions pertain the following:

According to survey data, male STAT 100 students have an **average weight of 168 lbs. and a SD = 20 lbs**. The histogram of their weights is close to the normal curve. In the questions below, you're given either a male's weight, Z score or percentile and you have to choose correct value for the missing blanks.

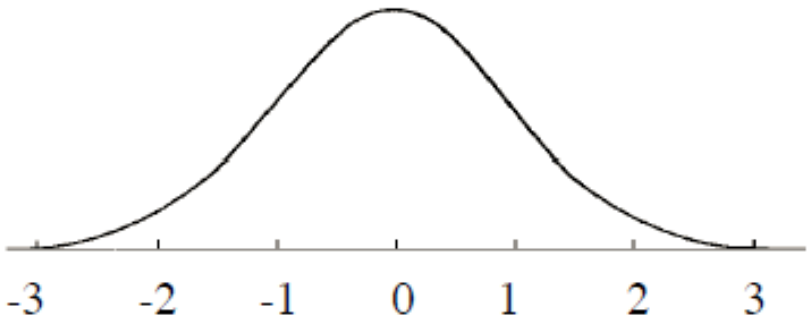
For all these problems, percentile stands for % of men who weigh less and please round the middle area % given in the Normal Table to the nearest whole number.

The following 3 questions pertain to Person A who weights 182 lbs

2 pt
Person A's Z score is closest to:

59. **A**◯ 0.8 **B**◯ -0.7 **C**◯ 0.7 **D**◯ 0.6 **E**◯ more information is needed

You may find it helpful to mark the Z score on curve, divide the curve into a middle area and 2 tails and mark the % of the area within each of the 3 parts. **Please round the middle area % to the nearest whole number**.



1 pt
The % of middle area is closest to _____ %.

60. **A**◯ 76 **B**◯ 24 **C**◯ 52 **D**◯ 48 **E**◯ more information is needed

0.5 pt
Person A is in the ___ percentile.

61. **A**◯ 52 **B**◯ 76 **C**◯ 24 **D**◯ 38 **E**◯ more information is needed

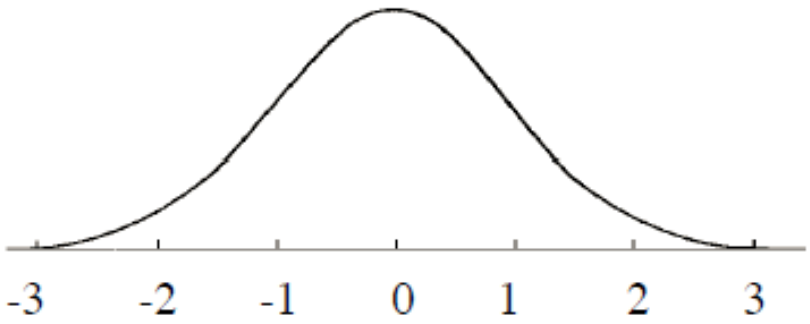
The following 3 questions pertain to Person B who has Z = -1.65 (Note **negative** sign.)

2 pt

Person B's weight is closest to:

62. **A**◯ 188 **B**◯ 135 **C**◯ 201 **D**◯ 148 **E**◯ more information is needed

You may find it useful to mark Z score on curve, divide the curve into a middle area and 2 tails and mark the % of the area within each of the 3 parts. **Please round the middle area % to the nearest whole number**.



1 pt

The % of middle area is closest to _____ %.

63. **A**◯ 90 **B**◯ 10 **C**◯ 95 **D**◯ 5 **E**◯ more information is needed

0.5 pt

Person B is in the ___ percentile.

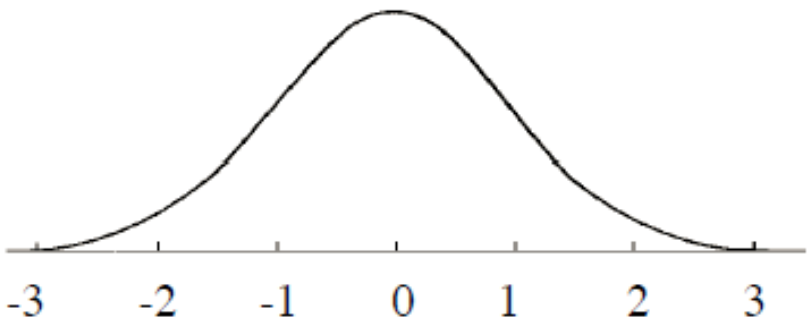
64. **A**◯ 4 **B**◯ 5 **C**◯ 6 **D**◯ 7 **E**◯ more information is needed

The following 3 questions pertain to Person C who is in the <u>97</u> <u>th</u> <u>percentile</u>

1 pt

What middle area should you look up on the normal table to find the correct Z score for Person C?

65. **A**◯ 48.5 **B**◯ 94 **C**◯ 97 **D**◯ 3 **E**◯ more information is needed



You may find it helpful to mark the correct Z-score on the curve (use z that is closest on the table), divide the curve into a middle area and two tails and mark the % within each of the 3 parts.

0.5 pt

Person C's Z score is closest to:

66. **A**◯ 2 **B**◯ 1.9 **C**◯ 1.8 **D**◯ -1.9 **E**◯ more information is needed

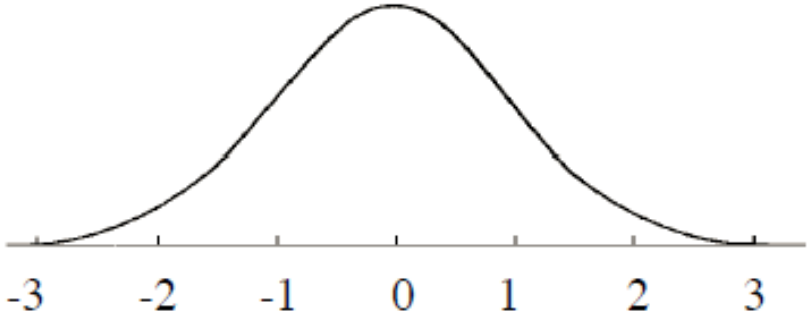
0.5 pt

Person C's weight is closest to:

67. **A**◯ 188 **B**◯ 148 **C**◯ 206 **D**◯ 130 **E**◯ more information is needed

The following 3 questions pertain to Person D who is in the 3 rd percentile

You may find it helpful to mark the Z score on the curve, divide the curve into a middle area and 2 tails and mark the % of the area within each of the 3 parts.**Please round the middle area % to the nearest whole number**.



1 pt

The % of middle area is closest to _____ %.

68. **A**◯ 6 **B**◯ 94 **C**◯ 97 **D**◯ 3 **E**◯ more information is needed

0.5 pt

Person D's Z score is closest to

69. **A**◯ -1.9 **B**◯ 1.9 **C**◯ -2 **D**◯ -1.8 **E**◯ more information is needed

0.5 pt

Person D's weight is closest to:

70. **A**◯ 206 **B**◯ 130 **C**◯ 188 **D**◯ 148 **E**◯ more information is needed

59)	• C • false • false • true • false • false
60)	• C • false • false • true • false • false
61)	• B • false • true • false • false • false
62)	• B • false • true • false • false • false
63)	• A • true • false • false • false • false
64)	• B • false • true • false • false • false
65)	• B • false • true • false • false • false
66)	• B • false • true • false • false • false
67)	• C • false • false • true • false • false
68)	• B • false • true • false • false • false
69)	• A • true • false • false • false • false
70)	• B • false • true • false • false • false